

Title:

Arizona Department of Water Resources Land Subsidence Monitoring Program Using Interferometric Synthetic Aperture Radar (InSAR)

Abstract:

The Arizona Department of Water Resources (ADWR) land subsidence monitoring program has been greatly enhanced by the use of Interferometric Synthetic Aperture Radar (InSAR). ADWR's InSAR program started in 2002 with the awarding of a three year NASA Earth Science grant, allowing ADWR the opportunity to develop the program.

In 2005, ADWR began collecting and processing monthly SAR data from the European and Canadian Space Agency SAR satellites, producing time-series interferograms for the greater Phoenix and Tucson metropolitan areas. Since 2005 the program has developed important partnerships with numerous Federal, State, County, and Local Agencies, Water Districts and Water Companies who provide annual contributions to help support the data collection costs. These partnerships have provided ADWR the necessary resources to expand the data collection area for the InSAR program to include numerous groundwater basins in south-central and southern Arizona in Maricopa, Pinal, Pima, La Paz, and Cochise Counties.

Through these efforts ADWR has collected more than \$1.3 million of InSAR data covering more than 50,000 square miles in Arizona. ADWR has identified more than 25 individual land subsidence features that cover respectively more than 2,800 square miles and has determined the spatial extent, deformation rates, and time-series history of each land subsidence feature with the InSAR data. The process of collecting, processing, and interpreting InSAR data has resulted in ADWR producing a total of 240 land subsidence maps for all the land subsidence features covering different time periods.

Engineers, hydrologists, geologists, GIS professionals, and scientists involved in the fields of water resources, structural engineering, geological engineering, hydrological engineering, land planning, floodplain management, and surveying greatly benefit from the InSAR data to identify and evaluate areas of land subsidence, uplift, earth fissures, faults, and many other geologic features.